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The role of self-criticism in common mental health difficulties in students: a systematic review of prospective studies

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Abstract

Self-criticism is a trans-diagnostic construct that has been receiving considerable research and clinical attention. The purpose of this systematic review was to explore whether there is evidence from prospective studies that self-criticism is significantly associated with subsequent symptoms of psychopathology. Searches were carried out in four electronic databases: PsychInfo, Embase, Medline and The Web of Science Core Collection. The methodological quality of the included studies was assessed and data was extracted and synthesised. Sixteen studies were identified for inclusion in this review, investigating depression only (n=12), depression and anxiety (n=2), depression and terrorism-related perceived stress (n=1) and social anxiety (n=1). In terms of depression, ten studies observed self-criticism, with weak to moderate effect sizes, to significantly predict an increase in symptoms over time. In terms of anxiety, none of the three studies found self-criticism to significantly predict an increase in symptoms over time. The one study of terrorism-related perceived stress found self-criticism, with a weak effect size, to significantly predict an increase in symptoms over time. The methodological quality of studies ranged from fair to good, with study attrition, and its subsequent consideration in the analysis process, being a primary methodological flaw. The use of the Depressive Experiences Questionnaire (DEQ) to measure self-criticism was also problematic as this scale was designed to measure self-critical depression and includes items about depression. This systematic review provides

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some evidence that there is a significant prospective relationship between self-criticism and symptoms of psychopathology amongst a student sample, with the strongest evidence for depression.

Keywords: Self-criticism, psychopathology, student mental health, prospective

1. Introduction

1.1 Self-criticism

Self-criticism involves judging and scrutinising oneself in a harsh and punitive manner (Shahar et al., 2011). Self-critical individuals tend to be sensitive to disapproval or criticism from others, competitive and judgmental towards themselves and others (Blatt, D’Afflitti & Quinlan, 1976) and achievement oriented (Blatt & Zuroff, 1992). Self-criticism is associated with more self-presentation goals and fewer interpersonal goals (Mongrain & Zuroff, 1995). A negative association has also been found between self-criticism and self-reported goal-progress (Powers, Milyavskaya & Koestner, 2012). In addition, individuals who are self-critical are more likely to negatively appraise achievement related events (Mongrain & Zuroff, 1989), demonstrate heightened ambivalence (Mongrain & Zuroff, 1994) and to exhibit self-defeating behaviours (Sherry, Stoeber & Ramasubbu, 2016). Self-criticism is also associated with increased negative affect and reduced positive affect (Mongrain & Zuroff, 1995).

1.2 Self-criticism as a vulnerability factor for psychopathology

Not only does self-criticism have a negative effect on day-to-day mood and affect, several theoretical models suggest that it may be a vulnerability factor for depression and other mental health disorders. One theory that appears frequently in the literature is Blatt’s theory of depressive personality style, which suggests that self-criticism is one of two personality styles (the second being dependency) that predisposes people to depression (Blatt & Zuroff, 1992). Similar suggestions about the role of premorbid personality characteristics have been made from researchers from a cognitive behavioural theoretical orientation. For example, Beck’s (1983) model suggested that two broad cognitive structures “autonomy” and “sociotropy”, predispose individuals to developing depression.

Autonomy includes a focus on meeting very high standards in order to maintain high self-esteem, and self-critical thinking occurs when it is perceived that the standards have not been met.

1.3 Self-criticism as a trans-diagnostic process

Findings from cross-sectional studies of self-criticism have been implicated in a range of psychopathologies, including depression, social phobia, eating disorders and post-traumatic stress disorder. This suggests that self-criticism may be a trans-diagnostic process. For instance, compared to never depressed controls, self-criticism is higher amongst both currently and remitted depressed individuals (Ehret, Joormann & Berking, 2015). Similarly, amongst both depressed patients and college students, self-criticism has been observed to account for a significant amount of variance in measures of depression beyond that accounted for by neuroticism (Clara, Cox & Enns, 2003). Mothers with post-partum depression have also been found to have significantly higher levels of self-criticism (Vliegen & Luyten, 2009). Self-criticism is not unique to depression, however; for instance, Luyten and colleagues (2007) observed that self-criticism did not differ between depressed and mixed psychiatric patients. Additionally, social phobia patients have been found to have higher scores of self-criticism than healthy controls (Cox et al., 2000; Iancu, Bonder & Ben-Zion, 2015) and self-criticism can predict scores on the Liebowitz social anxiety scale (Iancu et al., 2015). There is also evidence of an association between self-criticism and post-traumatic stress disorder. For instance, Cox and colleagues (2004) observed that elevated levels of self-criticism (and neuroticism) were significantly associated with PTSD among men and women who experienced one or more traumatic events. Moreover, Sharhabani, Amir and Swisa (2005) found that a self-critical personality style was associated with PTSD intensity among victims of domestic violence. Self-criticism is also associated with eating disorders, with evidence that both anorexic and bulimic patients, in particular, score higher than controls on measures of self-criticism (Speranza et al., 2003). Similarly, amongst day and inpatient eating disorder patients, Kelly and Carter (2013) found higher self-criticism to be associated with elevated eating disorder pathology through feelings of shame. Other forms of psychopathology that have been associated with self-criticism include bipolar disorder (Francis-Raniere, Alloy & Abramson, 2006), suicidality (Clara, Cox & Enns, 2004;

Faaza & Page, 2003) and self-injurious behaviour (Glassman, Weierich, Hooley, Deliberto & Nock, 2007).

1.4 Type of evidence

Clearly, there is substantial evidence from cross-sectional studies that self-critical thinking is elevated in people with psychological problems. However, cross-sectional studies are not able to identify any direction of causality and hence the results are open to interpretation. More specifically, it is not possible to know whether the self-criticism is a characteristic or result of the disorder rather than having any aetiological, maintenance or relapse contribution. There is now an increasing number of studies investigating the longitudinal relationship between self-criticism and/or related constructs and psychopathology. This longitudinal design cannot directly test causality. However, researchers have argued that if self-criticism is associated with subsequent clinical symptomatology, this indicates that it is unlikely to simply be the result of psychological disorder. Indeed, if baseline levels of symptomatology are controlled for in the analysis, this indicates that self-criticism may have a contributory role in the maintenance or increase in psychological problems.

1.5 Rationale for current systematic review

Considering the trans-diagnostic nature of self-criticism, alongside the limitations of the cross-sectional research highlighting its association with psychopathology, it is important to determine the strength of any longitudinal associations. To date, no systematic reviews have been identified of prospective studies, which explore the relationship between self-criticism and subsequent symptoms of common mental health difficulties. If the evidence suggests that self-criticism is associated with subsequent levels of psychopathology, it may be an important factor to target for intervention, particularly early intervention or relapse prevention. One particular population that may benefit from early intervention is students. This review, therefore, focuses exclusively on studies involving student samples. There are several additional reasons for this. First, student mental health is becoming an increasing concern across the globe with a growing number of students seeking psychological support (e.g. Kitzrow, 2003; Gallagher, 2011). This suggests a need to identify potential vulnerability

factors in this population. Second, self-criticism is viewed as a central feature of unhealthy perfectionism, of which there are high levels in academic settings (Arpin-Cribbie et al., 2008), and which is associated with fatigue, depression and anxiety (Dittner, Rimes & Thorpe, 2011; Kawamura et al., 2001). Thirdly, evidence suggests that there are comparable rates of psychiatric disorders amongst students and non-students (Blanco et al., 2008), hence, findings may also be of relevance to non-student populations. Lastly, since students tend to be a relatively homogenous group in terms of characteristics such as age, socioeconomic status, stressors, findings from this review may be subject to fewer potential confounders, making the results easier to interpret. The purpose of this systematic review is, therefore, to explore whether there is evidence from prospective studies that self-criticism is associated with subsequently higher levels of symptoms of psychopathology amongst students.

2. Method

2.1 Search strategy

Four databases were used to search for potentially relevant studies: OvidSP (PsychInfo, Embase Classic and Embase, Medline) and The Web of Science Core Collection. The following limits were applied to each of the searches where applicable: abstracts, human, English language, adulthood >age 18. The initial search took place in June 2015 and an updated search was carried out in April 2017.

2.2 Search terms

The search terms used were:

“self-critic*” OR “self evaluat*” OR “self jud*” OR “self attitude*” OR “inner critic” OR
 “negative self statement” OR “self appraisal” OR “self assessment” OR “self denigrat” OR
 “self critical perfectionis*” OR “dysfunctional perfectionis*” OR “maladaptive perfectionis*”
 OR “negative perfectionis*” OR “unhealthy perfectionis*” OR “evaluative concern*” OR
 “maladaptive concern*” OR “perfectionist concern*” OR “concern* over mistake*”

AND

Psychopathology OR mental disorder OR psychiatric symptom* OR psychological disorder* OR psychological difficult* OR common mental health problem* OR affective disorder* OR mood disorder* OR major depress* OR depress* OR low mood OR dysthymi* OR anxiety disorder* OR phobi* OR acrophobia OR agoraphobia OR claustrophobia OR ophidiophobia OR social phobia OR social anxiety OR generalised anxiety disorder OR GAD or obsessive compulsive disorder OR obsessions OR compulsions OR OCD or panic disorder OR panic attack* OR post traumatic stress disorder OR acute stress disorder OR PTSD OR eating disorder* OR anorexi* OR bulimi* OR binge eating OR eating pathology OR eating disorder not otherwise specified OR EDNOS

AND

Prospective* OR longitudinal* OR premorbid OR predict* OR track* OR anteceden* OR cohort OR incidence OR outcome OR "follow up" OR risk factor" OR "at risk" OR "before and after"

2.3 Selection criteria

The inclusion and exclusion criteria are outlined below:

2.3.1 Inclusion

- 1) Prospective studies investigating self-criticism and subsequent levels of psychopathology among common mental health problems. The mental health disorders considered were depression, anxiety disorders (generalised anxiety disorder, phobia, panic disorder, OCD and social anxiety), PTSD, and eating disorders (anorexia, bulimia, binge eating and eating disorders not otherwise specified). The disorders included in this review are primarily those disorders that have been found to have cross-sectional associations with self-criticism and therefore may be particularly amenable to preventative interventions addressing this process. These disorders are also the most prevalent in student populations, compared to severe mental health disorders such as psychosis.
- 2) Self-criticism is measured using a valid and reliable self-report or interview based measure. If this is assessed as part of a measure of a broader construct such as depression, low self-esteem or perfectionism, self-criticism must have been reported as a separate sub-component in its own right.

- 3) Studies with an adult student sample.
- 4) Psychopathology is measured using a valid and reliable self-report or interview based measure.
- 5) Published in a peer-reviewed journal.

2.3.2 Exclusion

- 1) Intervention studies.
- 2) Studies where all participants have an existing psychiatric diagnosis.
- 3) Self-criticism is not measured independently to psychopathology, or as a distinct component of broader constructs such as self-esteem or perfectionism.
- 4) Studies not written in English.
- 5) Commentaries, reviews, editorials, posters and unpublished dissertations.

2.4 Selection process

Once the initial search was carried out, the references were exported into EndNote and then into Excel. The titles and abstracts were screened by the main author and full-texts were sourced for any potentially relevant studies.

2.5 Data extraction

See Table 1 for the data that was extracted from the included studies.

2.6 Quality assessment

The methodological quality of the included studies was assessed using criteria from a checklist for the reporting of observational longitudinal research developed by Tooth, Ware, Bain, Purdie and Dobson (2004) (See Table 1). This checklist was specifically created to assist authors, editors and readers of longitudinal research assess any threats to internal or external validity of studies. The specific criteria used in the current research, focused on descriptive issues relevant to the study rationale, study population and generalisability, data collection, study completion/attrition and data analysis. Ratings were made on a 0, 1, 2 bases, where 0 = not present/poor, 1 = partially present/fair, and 2 = present/good. The overall score was categorised as poor (0-10), fair (11-20), adequate (21-25) and good (26-

30). The methodological quality of the included studies is summarised in Table 3. Five of the included studies were independently evaluated by a second trainee clinical psychologist. The strength of the agreement between the two assessors was 'very good' ($k = 0.82$, $p < .005$) (Altman, 1999). Minor discrepancies were resolved through discussion until a consensus was reached for the reported rating.

3. Results

3.1 Selection of studies

A PRISMA flowchart highlights the selection process for this review (See Figure 1). In total, 16 papers were identified for inclusion in this review.

3.2 Characteristics of included studies

3.2.1 Setting

Studies were carried out in a range of different countries, with Canada ($n=6$) being the most common, followed by Israel ($n=5$) and the United States ($n=2$); one study each was carried out in the United Kingdom, Taiwan and China. There was some overlap between studies with the same author(s) involved in several studies. One author was involved in all five studies carried out in Israel; one author from two of the Canadian studies was involved in the Chinese study; and two or three authors were involved in each of the remaining four Canadian studies.

3.2.2 Sample

A total of 3,427 target participants were included in the reviewed studies. Sample sizes ranged from 66 participants (Zuroff et al., 2015) to 640 participants (Yao et al., 2009). Samples comprised undergraduate university students ($n=12$), medical students ($n=1$) and emerging/young adults attending some form of academic programme ($n=3$). All studies had a predominantly female sample, with two studies consisting of an entirely female sample (Peleg-Sagy & Shahar, 1990; Zuroff et al., 2015). Nine of the sixteen studies explicitly reported the ethnicity of participants with Caucasian most commonly reported ($n=8$).

3.2.3 Longitudinal design

The majority of studies involved two time-points ($n=10$), while studies with three time-points ($n=3$), four time-points ($n=1$) and more than 4 time-points ($n=2$) were less common. In relation to time-frame, most studies ranged from 6 to 12 months in duration ($n=8$), while fewer studies were less than 6 months ($n=4$) or more than 12 months in duration ($n=4$). The shortest time-frame was just 7 weeks (Sturman et al., 2015) and the longest time-frame was 10 years (Brewin & Firth-Cozens, 1997). Looking at the retention of participants over time, only five studies retained at least 80% of participants by T2 (Gautreau et al., 2015; Liu et al., 2012; McGrath et al., 2012, Sherry et al., 2013 & Sherry et al., 2014) and only one study retained at least 80% of participants by T3 and T4 (McGrath et al. 2012). Four studies did not report their retention/attrition rates (Priel & Shahar, 2000; Shahar, 2006; Spasojevic & Alloy, 2001; Yao et al., 2009). Thus, seven studies had more than 20% loss to follow-up by T2 and three studies had more than 20% loss to follow-up by T3.

3.2.4 Measurement of self-criticism

With regard to the assessment of self-criticism, the most common measure used was the Depressive Experiences Questionnaire (DEQ) (Blatt, D'Afflitti & Quinlan, 1976) ($n=15$). Six studies specified using either the short-form of this measure or only using those items relating to self-criticism. One study used the Personal Style Inventory (PSI) (Robins et al., 1994), a revised measure of the Sociotropy and Autonomy Scale (SAS) (Beck, Epstein, Harrison & Emery, 1983) to measure self-criticism. In addition to the DEQ, two studies used several subscales of multi-dimensional perfectionism and developed a composite score of self-criticism based on these (Sherry et al., 2013; Sherry et al., 2014).

3.2.5 Measurement of psychopathology

In terms of outcome, the vast majority of studies were concerned with either depression on its own ($n=12$) or depression alongside anxiety ($n=2$) or terrorism-related stress ($n=1$). Only one study focused exclusively on a disorder other than depression, namely social anxiety (Gautreau et al., 2015). Only one study used a diagnostic measure, specifically the Schedule for Affective Disorders and Schizophrenia (SADS) (Endicott & Spitzer, 1978) (Spasojevic & Alloy, 2001), while most studies used one or more continuous measures. The two most commonly used continuous measures were the Centre for Epidemiological Studies –

Depression Scale (CES-D) (Radloff, 1977) (n=6) and the Beck Depression Inventory (BDI/BDI-II) (Beck, Steer & Carbin, 1988; Beck, Steer & Brown, 1996) (n=6). Alongside the BDI, one study assessed anaclitic and introjective state depression by asking participants to describe a "worst period" and rate it on 18 adjectives using a 7-point Likert scale (Zuroff et al., 1990). Other depression-specific measures used were: The Depression Adjective Checklist Form G Short Form (DACL-G-SF) (Sherry & Hall, 2009) (n=1), Symptom Checklist - Revised Depression Scale (SCL-R-D) (Derogatis, 1994) (n=1), the Depression Anxiety Stress Scale (DASS-D) (Lovibond & Lovibond, 1995) (n=1) and The Self-Report Depression scale (SRDS) (Zung, 1965) (n=1). Depression was also measured using the more generic measure of the Symptom Checklist (SCL-90) (Derogatis, Lipman & Covi, 1973) (n=1). The Mood and Anxiety Symptoms Questionnaire (MASQ) (Watson et al., 1995) (n=1) and the Brief Symptom Inventory (BSI) (Derogatis & Melisaratos, 1983) (n=2) were used to assess depression/anxiety and depression/terrorism-related perceived stress. In addition to the BSI, terrorism-related perceived stress was assessed using a single item rated on a 7-point Likert scale (Lassri et al., 2013). Finally, social anxiety was measured using three widely used measures, namely the Social Interaction Anxiety Scale (SIAS) (Mattick & Clarke, 1998), Social Phobia Scale (SPS) (Mattick & Clarke, 1998) and the Liebowitz Social Anxiety Scale (LSAS) (Liebowitz, 1987).

3.2.6 Data analysis

Twelve studies carried out correlational analyses to test whether there is an association between self-criticism and subsequent levels of psychopathology. In addition, some studies conducted multiple hierarchical regression analysis (n=10) or cross-lagged structural equation modelling (n=7) to determine the predictive effect of self-criticism on psychopathology. Mediation analysis (n=1) and general linear modelling were also reported (n=1).

3.3 Methodological quality of included studies

The quality of studies included in this review were rated as fair (n = 4), adequate (n =6) and good (n =6) (See Table 3). All studies received present/good ratings for the criteria assessing the exposure (self-criticism) and outcome (psychopathology) measures and the statement of longitudinal methods of analyses. Almost all studies (n =15) received present/good

ratings for the criteria assessing the statement of objectives/hypotheses, describing the sample and accounting for confounders in the analyses. More specifically, baseline psychopathology was accounted for in all but one study (i.e. Spasojevic & Alloy, 2001). Overall, studies were least likely to meet criterion 9 ('is loss to follow-up after baseline 20% or less?'), with just three studies receiving a rating of present/good and two studies receiving a rating of partially present/fair (i.e. if attrition rates varied across different time-points). Related to this, half of the studies (n=8) received a rating of not present/poor for criterion 12 ('is loss to follow-up taken into account in the analysis?'). Half of the studies also received a rating of not present/poor for criterion 14 ('are missing data accounted for in the analyses?'), however, seven studies received a rating of present/good for this criterion, increasing the overall score. All studies received a partially present/fair rating for criterion 2 ('is there an adequate description of sampling frame, recruitment methods, period of recruitment and place of recruitment?') with most not reporting information about the period (n = 16), followed by place (n = 4) or methods (n = 2). The criteria relating to follow up and missing data are especially important for determining the quality of longitudinal research and are likely to influence the validity of the results.

3.4 Findings from included studies

3.4.1 *Is self-criticism associated with subsequent depressive symptoms?*

Ten studies observed a significant positive relationship between self-criticism at T1 and depression at T2 (Brewin & Firth-Cozens, 1997; Kopala-Sibley et al., 2015; McGrath et al., 2012; Peleg-Sagy & Shahar, 2015; Priel & Shahar, 2000; Sherry et al., 2013; Sherry et al., 2014; Shulman et al., 2009; Spasojevic & Alloy, 2001; Sturman et al., 2015). For most of these studies a moderate effect size was observed, with three studies demonstrating a strong effect size (McGrath et al., 2012; Priel & Shahar, 2000; Sherry et al., 2014). For one of these studies the relationship was observed using both self and informant report of self-critical perfectionism (Sherry et al., 2013). Three studies also observed a significant positive relationship between self-criticism at T1 and depression at T3 (Brewin & Firth-Cozens, 1997; McGrath et al., 2012; Sherry et al., 2014), with all but one of these studies demonstrating a moderate to strong effect size. Just one study observed a relationship, with a strong effect size, at T4 (McGrath et al., 2012). No studies failed to observe a significant relationship between T1 self-criticism and subsequent depression.

Controlling for T1 depression, seven studies (of the fourteen that tested for this) found that self-criticism at T1 predicted a significant increase in symptoms of depression between T1 and T2 (Brewin & Firth-Cozens, 1997; Liu et al., 2012; Priel & Shahar, 2000; Sherry et al., 2013; Sherry et al., 2014; Shulman et al., 2009; Sturman et al., 2015; Yao et al., 2009). Four of these studies observed a moderate effect size and three of them observed a weak effect size. Although just one study found T1 self-criticism to predict a significant increase in depressive symptoms at T3 (10 years), this result was only evident amongst male participants and the effect size was weak (Brewin & Firth-Cozens, 1997). Four studies did not find self-criticism to significantly predict an increase in depressive symptoms between T1 and T2 (McGrath et al., 2012; Peleg-Sagy & Shahar, 2015; Shahar, 2006; Zuroff et al., 1990), with only McGrath and colleagues (2012) reporting the non-significant statistical results. Although McGrath and colleagues (2012) did not find a significant increase in depressive symptoms between T1 and T2, they did find an increase in symptoms between T2 and T3 and between T3 and T4, with a moderate effect size at each time-point. One additional study found a significant increase in symptoms between T2 and T3, with a weak effect size (Sherry et al., 2014). While Zuroff and colleagues (1990) did not find self-criticism to predict an increase in depressive symptoms using the BDI, they found self-criticism to

significantly predict introjective state depression as measured by a “worst period” rating (Zuroff et al., 1990). Shahar (2006) observed a three-way interaction between self-criticism, stress and depression, whereby under high but not low stress, T1 depression enhanced the effect of self-critical perfectionism on T2 depression. One study found a significant negative effect between T1 self-criticism and T2 depression, which they explained was likely due to suppression effects (Kopala-Sibley et al., 2015).

Spasojevic and Alloy (2001) explored whether rumination or private self-consciousness (PSC) mediated the relationship between self-criticism and number of prospective major depressive episodes (MDE's). They found that, with rumination as a potential mediator, the relationship between self-criticism and number of prospective MDE's lost significance when rumination was entered into the equation. In contrast, with PSC as a potential mediator the relationship maintained its significance when PSC was entered into the equation, suggesting that only rumination mediates the relationship between self-criticism and number of prospective MDE's. Liu and colleagues (2012) also report evidence consistent with the suggestion that self-criticism may exert a longitudinal effect on depressive symptoms through excesses of interpersonal behaviour, including aggression, openness and dependency.

3.4.2 Is self-criticism associated with subsequent symptoms of anxiety?

Two studies observed a significant positive relationship, with weak effect sizes, between self-criticism at T1 and anxiety at T2 (Shulman et al., 2009; Sherry et al., 2014) and T3 (Sherry et al., 2014). However, controlling for T1 anxiety, neither of these studies found self-criticism at T1 to significantly predict an increase in anxiety symptoms at T2. Another study observed a significant positive relationship, with moderate effect sizes, between self-criticism at T1 and social anxiety at T2 and T3 (Gautreau et al., 2015). However, controlling for T1 social anxiety, this study also did not observe self-criticism at T1 to significantly predict social anxiety symptoms at T2. No other studies found self-criticism at T1 to significantly predict an increase in anxiety between T1 and T2.

3.4.3 Is self-criticism associated with other subsequent symptoms of psychopathology?

One study, which investigated the effect of self-criticism on terrorism-related perceived stress and depression, observed a significant positive relationship, with a weak effect size,

between self-criticism at T1 and perceived stress-related exposure at T2 (Lassri et al., 2013). This study also found self-criticism at T1 to significantly predict, with a weak effect size, an increase in levels of psychopathology at T2 under high levels of perceived stress-related exposure, but not under low levels of perceived stress-related exposure. No other studies were identified which were exploring the association between self-criticism and subsequent psychopathology.

4. Discussion

4.1 Aims and key findings

The aim of this systematic review was to explore whether there is evidence that self-criticism is associated with higher levels of symptoms of psychopathology amongst common mental health problems over time, in student populations. Since the majority of studies concerned depression as the primary outcome, it is not possible to fully answer the review question with regard to the full range of common mental health disorders. However, findings from the current review suggest that high self-criticism is associated with high subsequent levels of symptoms of depression, with evidence of moderate to strong effect sizes. This finding is reasonably valid given that the methodological quality of the ten studies that explored this relationship was mostly good ($n=6$) or adequate ($n=3$) with just one study rated fair ($n=1$). It should be noted that this does not necessarily indicate a causal relationship. However, the fact that this finding held up when baseline levels of depression were controlled for in ten studies implies that self-criticism is associated with later depression, over and above the level of initial symptoms. Similarly, in a meta-analysis of longitudinal research, Smith and colleagues (2016) found that seven dimensions of perfectionism, including self-criticism, had small positive relationships with follow-up depression even when baseline depression and neuroticism were controlled for. Indeed, as that meta-analysis suggests, it is possible that a third variable influenced both self-criticism at T1 and depression at T2 in the studies included in the current review. The ten studies in the current review that found T1 self-criticism to be associated with an increase in depressive symptomatology between baseline and follow-up assessments, even when controlling for baseline depression, showed weak to moderate effect sizes. This finding is reasonably valid given that the methodological quality of most of these studies was good

($n=5$) or adequate ($n=2$) with just one study rated as fair. Although three studies did not find self-criticism to be significantly associated with an increase in symptoms of depression, the methodological quality of these studies was either adequate ($n=2$) or fair ($n=1$). This provides evidence consistent with the suggestion that self-criticism may play a contributory role in maintaining or increasing levels of depressive symptomatology. This would indicate that interventions targeting self-criticism may be protective in reducing this risk.

However, a key finding from this review concerns the measurement of self-criticism, with the vast majority of studies using the Depressive Experiences Questionnaire (DEQ) (Blatt et al., 1976). The original 66-item version of questionnaire was not developed as a measure of self-criticism but rather as a measure of introjective and anaclitic depression. Findings from the nine studies using the full 66-item DEQ need to be interpreted with caution. Five of the reviewed studies (3 of which received the highest quality ratings) used a short-form of the DEQ measuring those items that loaded most strongly onto the self-criticism factor (9-items: Bagby, Parker, Joffe & Buis, 1994; 5-items: Blatt, Quinlan, Chevron, McDonald & Zuroff, 1982). However, even some of the items from the short-form of the DEQ may be measuring symptoms of depression e.g. “many times I feel helpless” (9 items) and “I often feel guilty” (5 items). Similarly, the Personal Style Inventory (Robins et al., 1994), another measure used by one of the reviewed studies, was also not developed as a measure of self-criticism but rather as a measure of sociotropy and autonomy. Although there is some overlap between autonomy and self-criticism, they are nevertheless two different constructs. Two studies also used subscales of multi-dimensional perfectionism measures, alongside the DEQ-SF, to assess self-critical perfectionism. Thus, in this research self-criticism was viewed as a dimension of perfectionism, rather than as a separate construct.

There is a dearth of prospective studies exploring the effect of self-criticism on symptomatology of common mental health disorders other than depression. Findings from two studies in this review, suggest that self-criticism at T1 is associated with anxiety at T2 (and T3), however, to a lesser degree than depression, with evidence of weak effect sizes. Given that the methodological quality of the two studies were adequate or good, this finding may also be considered reasonably valid. Moderate effect sizes were also observed in the one study exploring the relationship between self-criticism and subsequent symptoms of social anxiety, with the methodological quality of this study rated as adequate,

which suggests the finding is reasonably valid. Unlike depression, none of the studies exploring the association between T1 self-criticism and subsequent anxiety, found an increase in symptoms between baseline and follow-up. Lastly, only one study explored the relationship between self-criticism and subsequent terrorism-related perceived stress, with the results suggesting that self-criticism is only associated with an increase in symptomatology in situations of high stress. Although the methodological quality of this study was adequate, the effect size was weak, so this finding should be interpreted cautiously. Therefore, the evidence suggests that the relationship between self-criticism and subsequent anxiety may be less strong than the relationship between self-criticism and subsequent depression. However, this comparison must be viewed with caution as the measure of self-criticism typically used, the DEQ, includes symptoms of depression so that the apparent relationship is likely to be inflated relative to that for anxiety. For all anxiety disorders, there is a clear need for further research to corroborate the evidence. No studies were identified regarding eating disorder psychopathology even though self-criticism has been reported as a common characteristic of individuals with these problems (Kelly & Carter, 2013).

Another notable finding is that most studies involved just two time-points, were 12 months or less in duration and attrition rates were high. Thus, although the findings offer some longitudinal evidence, it would be interesting to see whether the same effects would be observed with multiple time-points, over a longer time-frame and with better retention rates. With regard to retention rates, however, the few studies that did account for this in their analyses, did not find any significant differences on T1 measures between retained and lost participants. The one study that followed participants for ten years, observed that self-criticism was only associated with depression in males after this length of time despite females reporting more symptoms of depression overall. The authors of this study suggest that for females, depression may be related more to social or situational job-related factors than to personality or cognitive styles (Brewin & Firth-Cozens, 1997), especially in light of reported conflicts between career and family (Firth-Cozens, 1991). Although the quality of this study was rated as adequate, this observation may be of relevance to the findings of the current review, given that the majority of participants in the included studies were female undergraduates. Indeed, several studies recruited from within their own Psychology departments, where there is marked prevalence of female students (Cynkar, 2007).

Although T1 psychopathology was accounted for in the analyses of all but one of the studies in this review, most studies did not assess history of mental health problems, which may have influenced levels of self-criticism at T1. This is important since each episode of psychopathology may create 'scars' that increase self-criticism (Sturman & Mongrain, 2005). Therefore, despite findings from this review suggesting that there is a prospective relationship between self-criticism and psychopathology, causality is still not clear. Self-criticism may have a stronger association with subsequent episodes of psychopathology rather than first onset of psychopathology. Another related issue is the fact that all but one study used a continuous measure of psychopathology rather than a diagnostic assessment. Such continuous measures may be more sensitive for statistical analysis but cannot be assumed to represent a clinical diagnosis. Indeed, as Coyne (1994) cautions, self-reports of symptoms are qualitatively different to clinical diagnoses. However, the two most common continuous measures (i.e. BDI and CES-D) used by studies in this review have well established psychometric properties. The one study that did use a structured interview to assess depression, observed that the relationship between self-criticism and the number of prospective depressive episodes was mediated by rumination. Although, the quality of this study was judged as only fair, other research also suggests that there is some overlap between self-criticism and rumination. For instance, Treynor, Gonzalez and Nolen-Hoeksema (2003) refer to a particularly unhelpful form of rumination as "brooding", which involves "passive comparison of one's current situation with some unachieved standard" (p.256). It is this type of rumination, that has been associated with suicidal ideation among healthy adults (O'Connor & Noyce, 2008). Of note, no other studies in this review measured rumination and therefore could not account for it in their analyses.

4.2 Strengths and limitations

There were a number of strengths and limitations of the current review that need to be considered. With regard to strengths, the search strategy conducted was thorough and allows for replication of results. Moreover, the quality assessment tool used was selected specifically for assessing the quality of longitudinal research and was adapted to suit the objectives of the current review. The fact that almost one-third of the included studies were

evaluated by a second independent researcher helps to minimise researcher bias and adds to the validity of findings from this review. With regard to limitations, grey literature was not included in the review and there may have been a publication bias favouring studies finding a significant relationship between self-criticism and subsequent psychopathology. Furthermore, it should be noted that this review focused only on studies that included a student sample, hence the findings cannot be generalised to other adults or indeed any other age group, such as children or adolescents. Given the suggestion that self-criticism may have a prospective influence on mental health problems, tracking it from childhood/adolescence onwards may be particularly useful for the development of early intervention. Indeed, Kopala-Sibley, Klein, Perlman and Kotov (2016) found that self-criticism (and dependency) significantly predicted the first onset of almost all depressive and anxiety disorders amongst 550 never-depressed adolescent females. The current review also did not include studies when all participants had an existing psychiatric diagnosis which may have answered a different but related question about self-criticism as a maintenance factor in people with a current disorder. Similarly, intervention studies were not included, which would help to address the issue about whether self-criticism plays a contributory role in the development or maintenance of psychological difficulties.

4.3 Recommendations

As the body of research is relatively small any recommendations made are to be considered tentative. Nevertheless, findings from this review have implications for student mental health in that they indicate that self-criticism in students is associated with subsequently higher levels of depressive and anxious symptomatology. This suggests that self-criticism could be a useful construct to target in interventions addressing risk for depression or anxiety in this population. Further research is required, however, to understand the prospective relationship between self-criticism and other forms of common mental health problems. Specifically, research exploring the relationship between self-criticism and the full range of anxiety disorders and eating disorders over time, would be beneficial. To enhance the quality of this research, it is suggested that researchers aim to follow participants for more than two time-points, over more than one year and that they control for levels of psychopathology at T1 (including past episodes). It is also recommended that further

research is carried out using alternative or additional measures of self-criticism, such as the Forms of Self-criticism/Attacking & Self-reassuring Scale (Gilbert, Clarke, Hempel, Miles & Irons 2004) or the Self-Critical Rumination Scale (Smart, Peters & Baer, 2015).

Conclusions

In conclusion, this systematic review provides some evidence that there is a significant prospective relationship between self-criticism and symptoms of psychopathology amongst a student sample. The evidence associating self-criticism with depression is reasonably strong, and includes not only evidence of an association between levels of self-criticism and the degree of subsequent depression but also with *increases* in depression.

However, findings are much more limited for anxiety and no research was identified regarding eating disorders. Further good quality research is required to investigate further whether self-criticism contributes to the development, maintenance or worsening of psychopathology. Preventative and treatment interventions for common mental health disorders in students could consider targeting self-criticism (e.g. Rose, McIntyre & Rimes, submitted).

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Conflicts of interest

None

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Fig 1: PRISMA flow chart

Table 1: Quality assessment tool

Criterion	Not present/ poor (0)	Partially present/ fair (1)	Present/ good (2)
Study population and participation			
1. Are the objectives or hypotheses clearly stated?			
2. Is there an adequate description of sampling frame, recruitment methods, period of recruitment and place of recruitment?			
3. Is there an adequate description of the study sample e.g. number, age, sex?			
Data collection			
4. Is there an adequate description of methods of data collection i.e. tools and processes?			
5. Is the exposure measure i.e. self-criticism, clearly defined, valid, reliable and implemented consistently across all study participants?			
6. Is the outcome measure i.e. depression, clearly defined, valid, reliable and implemented consistently across all study participants?			
Study attrition			
7. Is the number of participants at each stage/wave specified?			
8. Is information on follow-up duration provided?			
9. Is loss to follow-up after baseline 20% or less?			
Data analyses			
10. Are 'longitudinal' methods of analysis stated?			
11. Are effect sizes (absolute, relative) reported?			
12. Is loss to follow-up taken into account in the analyses?			
13. Are confounders accounted for in the analyses?			
14. Are missing data accounted for in the analyses?			
15. Did authors relate results back to a target population?			
SCORE			

Table 2: Study characteristics and data extracted

Reference	Country	Assessment period	Sample	Completion/attrition	Main outcomes	Measure of self-criticism	Measure of psychopathology	Control for T1 psychopathology	Analyses	Results
Brewin & Firth-Cozens (1997)	United Kingdom	T1: baseline; T2: 2 years; T3: 10 years	318 4th year medical students; Age range: 20-37 years, M: 22.4 years; 186 male, 126 female, 6 unknown	T1: 318; T2: 170 out of 238 (72%); T3: 224 out of 302 (74.2%)	Depression	DEQ (5 items)	SCL-90 (depression subscale)	Yes, in regression model	Correlations* Multiple hierarchical Regression (Analysis 1 - Block 1: T1 depression; block 2: self-criticism, dependency and workload; dependent variable: T2 depression) Analysis 2 – as per analysis 1 but separately for males and females)	T2: $r = .44$, $p < .001$; T3: $r = .25$, $p < .001$; From Analysis 1 - T1 SC predicts T2 and T3 depression: T2: $B = .39$, $t(164) = 5.10$, $p < .001$; T3: $B = .21$, $t(211) = 2.96$, $p < .01$ From Analysis 2 – T1 SC predicts T2 and T3 depression for men: T2: $B = .47$, $t(195) = 5.05$, $p < .001$; T3: $B = .27$, $t(127) = 3.15$, $p < .01$ From Analysis 2 – T1 SC predicts T2 but not T3 depression for women: T2: $B = .33$, $t(64) = 2.13$, $p < .05$ T3: largest $B = .18$, largest $t(77) = 1.47$, $p >$

Gautreau, Sherry, Mushquash & Stewart (2015)	Canada	T1: baseline; T2: 193.89 (SD: 22.97) days after T1; T3: 186.34 (SD: 32.43) days after T2	301 undergraduate students; Mean age: 20.87 years, SD: 4.08 years; 71% female; 90% Caucasian	T1: 301; T2: 252(83.7%); T3: 218 (72.4%)	Social anxiety	DEQ (5 items)	SIAS; SPS & LSAS	Yes, in structural equation model	Bivariate correlations* Cross-lagged structural equation modelling*	T2 SIAS: $r = .46, p < .001$; T2 SPS: $r = .32, p < .001$; T2 LSAS-A: $r = .35, p < .001$; T3 SIAS: $r = .45, p < .001$; T3 SPS: $r = .37, p < .001$; T3 LSAS: $r = .41, p < .001$; T1-T2: $b = .07, p > .05$ T2-T3: $b = .07, p > .05$ $r = .36, p < .01$ Significant negative effect of T1 self-criticism on T2 depression (Result not reported)
Kopala-Sibley, Zuroff, Hermanto & Joyal-Desmarais (2015)	Canada	T1: baseline; T2: 12 months	82 emerging adulthood participants (+ closest friend) largely drawn from university pool; Age range: 18-20 years, M: 19 years, SD 0.75 years; 13 male; 60.8% Caucasian	T1: 115 completed baseline measures, 82 friends completed measures; T2: 67% completed measures of self-criticism, 58.5% completed measures of depression, 90.2% reported romantic relationship status	Depression	DEQ	BDI-II	Yes, in structural equation model	Bivariate correlations* Cross-lagged structural equation modelling*	

Lassri, Soffer-Dudek, Lerman, Rudich & Shahar (2013) (Study 1)	Israel	T1: baseline 1 year prior to Oferet Yetzuc (3 weeks of sustained missile attacks); T2: 2 weeks after Oferet Yetzuc had ended	67 undergraduates; Age range: 22-34 years, M: 24.78 years, SD: 1.98 years; 59 female, 8 male	T1: 91; T2: 67 (73.6%)	Terrorism-related perceived stress; depression	DEQ	7-point Likert scale assessing terrorism-related stress; BSI	Yes, in GLM model	Correlation*	r = .35, p < .01
									General linear modelling (Step 1: terrorism-related exposure, self-criticism, T1 psychopathology; step 2: two-way interactions with terrorism related exposure variables, self-criticism and baseline psychopathology; step 3: three-way interactions as per step 2; dependent variable: T2 psychopathology)	From step 2: T1 SC predicts T2 psychopathology under high but not low levels of stress-related exposure: High stress b = .33, S.E. = .13, B = .61, t = 2.61, p < .01; Low stress: b = -.21, S.E. = .16, B = -.40, t = -1.36, ns
Liu, Chen, Tsai, Wu & Hong (2012)	Taiwan	T1: baseline; T2: 6 months	84 college students; Age range: 18-24 years; M: 19.39 years; SD: 1.31 years; 89% female	T1: 84 completed baseline questionnaire, 79 completed event-contingent reporting; T2: 77	Depression	DEQ	BDI-II (Chinese version)	Yes, in structural equation model and in mediational analysis	Cross-lagged structural equation modelling* Mediation analysis	T1-T2: b = .369, p < .05 T1 SC predicted T2 depression mediated by

				complete d follow- up question naires, 75 complete d event- continge nt reporting						interperso nal behaviour s: B = .06, SE = .03, 95% BCa CI = .01 TO .10
McGrath, Sherry, Stewart, Mushquash, Allen, Nealis & Sherry (2012)	Canada	T1: baseline; T2: 1 week; T3: 2 weeks; T4: 3 weeks	240 undergraduate students enrolled in psychology courses; Mean age: 20 years; SD: 3.23 years; 83% female; 86.7% White; 47.5% single	T1: 240; T2: 238(96.7 %); T3: 230(95.4 %); T4: 232 (93.4%)	Depression	DEQ-SF (5 items)	CES-D-SF; DACL-G-SF & SCL-R-D	Yes, in structural equation model	Bivariate correlations* Cross-lagged structural equation modelling*	T2: r = .54, p < .001; T3: r = .45, p < .001; T4: r = .47, p < .001; T1-T2: b = .06, p > .001 T2-T3: b = .38, p < .001 T3-T4: b = .38, p < .001
Peleg-Sagy & Shahar (2015) (Study 1)	Israel	T1: baseline; T2: 1 year	194 medical students from 1st, 4th & 7th year; Age range: 21- 34 years, M: 26.56 years, SD: 2.57 years; 100% female	T1: 194; T2: 145 (74.7%)	Depression	DEQ	CES-D; BDI-II (average d score)	Yes, in regression model	Correlation* Multiple hierarchical regression (Block 1: T1 self- criticism, self- concept clarity, silencing the self and baseline of all outcome variables; block 2: two-way interactions Between 3 self variables; block 3: three-way interactions as per block 2; dependent	r = .42, p < .00 From block 1: SC did not significantly predict depression at T2 (Result not reported) From block 2 and 3: No significant two-way or three way interactions associating self- criticism with subsequent depression were observed (Results

									variable: T2 depression, sexual dissatisfaction, dyadic adjustment, physical symptoms)	not reported)
Priel & Shahar (2000)	Israel	T1: baseline; T2: 9 weeks	182 young adults (university college and military academy); Age range: 18-48 years, M: 23 years; 117 women, 65 men	Not reported	Depression	DEQ	CES-D	Yes, in both regression model and structural equation model	Correlation* Multiple hierarchical regression (Block 1: T1 distress, social support, interpersonal, achievement and other stress; sex; block 2: T1 self-criticism and dependency; block 3: T2 social support and 3 types of stress; block 4: two-way interactions (x11); block 5: higher order interactions (x6); dependent variable: T2 distress)	r = 0.61, p < .05; From block 2: T1 SC predicts T2 distress: R-squared = .04, F = 26.86, df = 8,172, F change = 7.21, B = 0.25, p < .000
									Structural equation modelling*	T1-T2: b = .17, p < .05

Shahar (2006)	Israel	T1: baseline (1 week prior to exam); T2: 8 weeks	260 1st year undergraduate students from a research university (n = 90) and a liberal arts college (n = 170); Age range: 19.5-29.7 years, M: 23.15, SD: 3.67 years; 171 women, 89 men	Not reported	Depression	PSI	BDI; CES-D; SRDS	Yes, in regression model	Multiple hierarchical regression (Step 1: gender, T1 depression, self-critical perfectionism, sociotropy, stress; Step 2: two-way interaction between vulnerability factors and i) stress and ii) T1 depression; Step 3: three-way interaction as per step 2; dependent variable: T2 depression)	SC did not significantly predict depression at T2 (Result not reported) From step 3: self-critical perfectionism interacted with T1 depression and subsequent stress to predict T2 depression: $R^2 = .39$, $F(11,194) = 9.02$, $p < .001$
Sherry, Nealis, Macneil, Stewart, Sherry & Smith (2013)	Canada	T1: baseline; T2: 28 days	155 undergraduate students (+ 588 friends/family members); 119 women; Mean age: 20.65 years, SD: 3.03; 70.3% of European descent	T1: 155 (100%); T2: 152 (98.1%)	Depression	DEQ (9 items); F-MPS-CM; HF-SP	DASS-D	Yes, in regression model	Bivariate correlations* Multiple hierarchical regression (Panel 1 - Step 1: T1 depression; step 2: T1 self-critical perfectionism (self-report); step 3: T1 self-critical perfectionism (informant report); dependent variable: T2 depression . Panel 2 -	Self-report: $r = .42$, $p < .001$; Informant report: $r = .32$, $p < .001$ Panel 1 - T1 SC predicts T2 depression: From step 2: Self-report: $B = .19$, $\Delta R^2 = .02$, $\Delta F = 4.95$, $p < .05$ From step 3: Informant report: $B = .19$, $\Delta R^2 =$

									as per panel 1 except informant-report in step 2 and self-report in step 3)	.03, $\Delta F = 6.66$, $p < .05$ Panel 2 – T1 SC predicts T2 depression: From step 2: Informant-report: $B = .24$, $\Delta R^2 = .06$, $\Delta F = 11.12$, $p < .001$ From step 3: Self-report: $B = .19$, $\Delta R^2 = .02$, $\Delta F = 4.95$, $p < .05$
Sherry, Richard S, Sherry & Stewart (2014)	Canada	T1: baseline; T2: 6 months; T3: 12 months	302 undergraduate psychology students; Mean age: 20.84 years; 219 female; 90.1% Caucasian	T1: 302; T2: 83.4%; T3: 72.2%	Depression, anxiety	DEQ-SF (9 items); HF-MPS-SP; F-MPS-CM & F-MPS-DA (composite score of 4 measures)	MASQ	Yes, in structural equation model	Bivariate correlations* Cross-lagged structural equation modelling*	T2 depression: $r = .56$, $p < .05$; T3 depression: $r = .49$, $p < .05$; T2 anxiety: $r = .21$, $p < .05$; T3 anxiety: $r = .25$, $p < .05$ T1-T2 depression: $b = .16$, $p < .05$ T2-T3 depression: $b = .15$, $p < .05$ T1-T2 anxiety: $b = .05$, $p > .05$ T2-T3 anxiety: $b = .05$, $p > .05$

Shulman, Kalnitzki & Shahar (2009)	Israel	T1: baseline; T2: 1 year	236 emerging adults attending preparatory academic programs; Mean age: 23.04, SD = 1.76; 115 men, 121 women	T1: 236; T2: 175 (74.2%)	Depression, anxiety	DEQ	BSI	Yes, in regression model	Correlation* Multiple hierarchical regression (Step 1: gender; step 2: T1 depression, anxiety, amotivation, educational success and goals, goal pursuit; step 3: self-criticism, efficacy; step 4: maternal, paternal and friend support; step 5: putative index; step 6: interactions between academic success/failure and goal adjustment, personality, gender; dependent variable: T2 depression, anxiety, amotivation, educational success and goals, goal pursuit)	T2 depression: $r = .46$, $p < .05$; T2 anxiety: $r = .37$, $p < .01$; From step 3: T1 SC predicts T2 depression but not anxiety: Depression: $B = .17$, $SE = .07$, $B = .14$, $\Delta R^2 = .03$, $p < .05$; Anxiety: $B = .06$, $SE = .066$, $B = .05$, $\Delta R^2 = .00$, $p > .05$
Spasojevic & Alloy (2001)	United States	T1: baseline; then every 6	137 1st year undergraduate	Not reported	Depression	DEQ	Modified SADS-C (diagnosis)	No	Correlation* Multiple	$r = .35$, $p < .001$ From step

		weeks for 2.5 years	students (subset from larger project); Age range: 16- 29 years, M: 19 years; 88 women, 49 men; 62.8% Caucasian , 25.5% African American, 4.4% Hispanic, 4.4% Asian & 2.9% Other				tic)		hierarchical regression (Analysis 3 of 6: Step 1: self- criticism; step 2: rumination ; step 3: self- criticism with rumination)	1, 2 and 3: T1 SC predicts subsequent depression, mediated by rumination: $t(129) = 3.23, p < .01, B = .27; t(128) = 1.34, p = .18, B = .13;$
Sturman, Rose, Keighan, Burch & Evanico (2015)	United States	T1: baseline; T2: 7 weeks	163 undergraduate psychology students; mean age: 20.02 years, SD: 4.97 years; 46 male, 117 female; 85.89% White, 4.9% African American, 2.45% Asian & 2.45% Hispanic	T1: 163; T2: 94 (57.67%)	Depression	DEQ	CES-D	Yes, in regression model and in structural equation model	Correlation* Multiple hierarchical regression (Step 1: T1 depression , involuntary subordination, defeating events; step 2: self- criticism; dependent variable: T2 depression , involuntary subordination, defeating events) Cross- lagged structural equation modelling*	$r = .53, p < .001$ From step 2: SC did not significantly predict depression at T2 (Result not reported) T1-T2: $b = .42, p = .001$

Yao, Fang, Zhu & Zuroff (2009)	China	T1: baseline; T2: 6 months	640 2nd or 3rd year undergraduate Chinese students; Age range: 17-23 years, M: 20.1 years, SD: 1.1 years; 343 females, 297 males; 93.1% Han Chinese, 6.9% ethnic minority	Not reported	Depression	DEQ (Chinese version)	CES-D	Yes, in regression model	Multiple hierarchical regression (Step 1: T1 depression; step 2: dependency, self-criticism and efficacy; step 3: two-way interactions between dependency, self-criticism and efficacy; step 4: three-way interactions as per step 3; dependent variable: T2 depression)	From step 2: T1 SC predicts T2 depression: Total sample: $B = .23$, $t = 4.76$, $p < .01$; Males: $B = 0.27$, $t = 3.71$, $p < .01$; Females: $B = 0.16$, $t = 2.39$, $p < .05$ From step 3: No significant two-way interaction between dependency and self-criticism ($B = -.01$, $t = -.03$, $p > .97$) or between efficacy and self-criticism ($B = .01$, $t = 0.12$, $p = .90$) was observed. From step 4: No significant three-way interaction between dependency, self-criticism and efficacy was
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										observed ($B = .02$, $t = .39$, $p > .69$)
Zuroff, Igreja & Mongrain (1990)	Canada	T1: 1-2 months; T2: 12 months	66 undergraduate students; 100% female	T1: 66; T2: 46 (73%)	Depression	DEQ	Retrospective BDI; "worst period" description rated using 7-point scale for 18 adjectives measuring anacritic and introjective state depression	Yes, in regression model	Multiple hierarchical regression (Analysis 2 - Step 1: T1 BDI; step 2: T1 dependency and self-criticism; step 3: two-way interaction between dependency and self-criticism; dependent variable: "worst period" measures)	From step 2: T1 SC did not significantly predict T2 depression as measured by BDI (Result not reported) From step 2: T1 SC predicts introjective state depression: $F(1,40) = 4.7$, $p < .05$, increment in R -squared = 7.5 No significant two-way interaction was observed (Result not reported)

Key: DEQ = Depressive Experiences Questionnaire; PSI = Personal Style Inventory; HF-MPS-SP = Hewitt & Flett -Multi-dimensional Perfectionism Scale Socially Prescribed subscale; F-MPS-CM = Frost-Multi-dimensional Perfectionism Scale Concern Over Mistakes subscale; F-MPS-DA = Frost-Multi-dimensional Perfectionism Doubts About Actions subscale; SCL-90 = The Symptom Checklist-90; BDI = Beck Depression Inventory; CES-D = Centre for Epidemiological Studies Depression Scale; SADS = Schedule for Affective Disorders and Schizophrenia; BSI = Brief Symptom Inventory; DACL-G-SF = Depression Adjective Checklist Form G Short Form; SCL-R-D = Symptom Checklist - Revised Depression Scale; SRDS = The Self-Report Depression Scale; DASS-D = Depression Anxiety Stress Scale; MASQ = Mood and Anxiety Symptoms Questionnaire; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; LSAS-A = Liebowitz Social Anxiety Scale

*Refers to relationship between T1 (or other prior time-point) self-criticism and subsequent psychopathology

**Refers to relationship between T1 (or other prior time-point) self-criticism and subsequent psychopathology having adjusted for T1 (or other prior time-point) levels of psychopathology

Table 3: Methodological quality of included studies

Reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Score
Brewin & Firth-Cozens (1997)	1	1	2	1	2	2	2	1	0	2	2	1	2	0	2	21 Adequate
Gautreau et al (2015)	2	1	2	2	2	2	2	2	1	2	2	0	1	2	2	25 Adequate
Kopala-Sibley et al. (2015)	2	1	2	2	2	2	2	2	0	2	2	1	2	2	2	26 Good
Lassri et al. (2013)	2	1	2	2	2	2	2	1	0	2	2	0	2	0	1	21 Adequate
Liu et al (2012)	2	1	2	2	2	2	2	2	2	2	2	0	2	2	2	27 Good
McGrath et al. (2012)	2	1	2	2	2	2	2	2	2	2	2	1	2	2	1	27 Good
Peleg-Sagy & Shahar (2015)	2	1	2	2	2	2	2	2	0	2	1	0	2	0	2	22 Adequate
Priel & Shahar (2000)	2	1	2	2	2	2	0	2	0	2	2	0	2	0	0	19 Fair
Shahar (2006)	2	1	2	2	2	2	0	2	0	2	1	0	2	1	0	19 Fair
Sherry et al (2013)	2	1	2	1	2	2	2	2	2	2	2	1	2	2	1	26 Good
Sherry et al. (2014)	2	1	2	2	2	2	2	2	1	2	2	2	2	2	1	27 Good
Shulman et al. (2009)	2	1	2	2	2	2	2	2	0	2	2	2	2	0	2	25 Adequate
Spasojevic & Alloy (2001)	2	1	2	2	2	2	0	2	0	2	2	0	2	0	1	20 Fair
Sturman et al. (2015)	2	1	2	2	2	2	2	2	0	2	2	2	2	2	1	26 Good
Yao et al. (2009)	2	1	2	1	2	2	0	2	0	2	2	0	2	0	2	20 Fair
Zuroff et al. (1990)	2	1	1	2	2	2	2	2	0	2	1	2	2	0	2	23 Adequate
	31	16	31	29	32	32	24	30	8	32	29	12	31	16	22	